

### **REMARKS**

This communication responds to the Office Action mailed on May 12, 2008. Claims 1, 9, 12, 18 and 26 are amended, claim 2 is canceled, and no claims are added in this communication. As a result, claims 1, 3 and 5-29 are now pending in this Application.

#### **§102 Rejection of the Claims**

Claims 1-3, 5-10 and 12-27 were rejected under 35 U.S.C. § 102(e) as being anticipated by Johnson et al. (U.S. 2006/0073800 A1, hereinafter “Johnson”). The Applicant does not admit that Johnson is prior art and reserves the right to swear behind this reference at a later date. In addition, because the Office has not properly established a *prima facie* case of anticipation, the Applicant respectfully traverses this rejection of the claims.

Anticipation under 35 USC § 102 requires the disclosure in a single prior art reference of each element of the claim under consideration. *See Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ 2d 1051, 1053 (Fed. Cir. 1987).

Amended independent claim 1 reads as follows, with emphasis added:

1. (Currently Amended) An apparatus, including:
  - a digital processor to shift a digital baseband signal upward along a frequency spectrum by a selected amount of frequency shift to provide a first elevated frequency digital baseband signal and a second elevated frequency digital baseband signal derived from a phase-shifted version of the digital baseband signal; and
  - a digital mixer to receive the digital baseband signal and to provide the first elevated frequency digital baseband signal,
    - wherein the selected amount of frequency shift is greater than about a bandwidth of the digital baseband signal.

The Applicant submits that Johnson does not disclose the feature of shifting the digital baseband signal upward along a frequency spectrum to provide elevated signals derived from a phase-shifted version of the digital baseband signal, wherein “the selected amount of frequency shift is greater than about a bandwidth of the digital baseband signal” as it is incorporated into amended independent claim 1 from original claim 2 (now canceled).

When rejecting original claim 2, the Office cites page 4 [paragraphs 0035-0037] of Johnson and asserts, “*Johnson et al teaches, wherein the selected amount is greater than about a bandwidth of the digital baseband signal.*” However, a close reading of Johnson, relied upon by the Office, reveals that this assertion is incorrect. Page 4 [paragraphs 0035-0037] of Johnson states:

[0035] The RF input signal is represented as a differential voltage signal between  $V_{RF+}$  and  $V_{RF-}$ .  $V_{BIAS}$  is a bias voltage selected to keep transistors 154 and 158 operating in the triode (linear) region of their voltage-current characteristic. Thus as  $V_{RF+}$  and  $V_{RF-}$  vary, they modulate the voltage at the sources of transistors 152 and 156, forming a differential current signal on the drains of transistors 132 and 136. The bits of the digital local oscillator signal LO cause transistors 162, 164, 166, and 168 to switch the current of current cell 150 from side to side. These currents are switched at the output speed of DDFS 130,  $f_{CLOCK}$ , which is constrained by Nyquist's theorem to be greater than twice the maximum  $f_{LO}$ .

[0036] The resolution (and hence the number of bits) required by DAC 120 can be determined by considering the worst-case energy in the undesired channels, since quantization noise will be mixed by the undesired channels into the desired band at the output of the mixer. A terrestrial television receiver may need to tune a relatively-weak desired channel when the receiver is close to the transmitter of a relatively-strong undesired channel. For example assume the desired channel has a signal strength of -83 dBm (where dBm represents a decibel power level with reference to a power level of 1 milliwatt dissipated across a 75 ohm load), an undesired channel has a signal strength of -15 dBm, and the minimum signal to noise ratio (SNR) required at the output of the mixer is 15 dB. The integrated quantization noise for the LO signal in a 6 MHz band for a 10-bit DAC clocked at 2 gigahertz (2 GHz) is -84 dBc (decibel level with respect to carrier frequency  $f_{LO}$ ). This quantization noise appears in every 6 MHz band from DC to  $f_{CLOCK}/2$  (1 GHz) and is mixed by the -15 dBm undesired channel into the desired channel's band at a -99 dBm level (-15 dBm+(-84 dBc)). The resulting SNR is thus -83 dBm-(-99 dBm) = 16 dB, which is greater than the minimum required SNR of 15 dB. Thus a 10-bit DAC yields barely acceptable results while a 9-bit DAC would not.

[0037] The switching speed of the DAC, which determines the maximum  $f_{LO}$  which can be created because the clock of the DAC must be greater than twice the maximum  $f_{LO}$ , is determined by the on resistance of transistors 162, 164, 166, and 168 in FIG. 4 and the parasitic capacitances at the sources of the switches. There is a practical speed limit for this structure in a given technology because as the switch resistance is decreased the parasitic capacitance increases. However the practical speed limit is in the range of several GHz for existing integrated circuit

technologies, which makes the DDFS/mixer combination suitable for a broad variety of radio frequency receiver applications.

From the above excerpt, it is clear that Johnson does not disclose the “digital baseband signal” at all, and thus cannot disclose the feature “the selected amount of frequency shift is greater than about a bandwidth of the digital baseband signal” as recited in amended independent claim 1.

Johnson does mention the baseband signal in terms of when “... the mixing operation  $I_{OUT}$  moves the spectral content of RF to sum and difference frequencies, namely  $f_{IN} + f_{LO}$  and  $f_{IN} - f_{LO}$ . DDFS 130 provides signal LO at a frequency chosen to mix the DESIRED CHANNEL to another frequency of interest, such as baseband or a suitable intermediate frequency (IF).” Johnson, para. [0030]. The term “baseband” is also used by Johnson with respect to the signals I and Q, which are filtered, not shifted. See Johnson, FIG. 5, and paras. [0042 – 0043]. Finally, Johnson refers to mixing down to the baseband when using the tuner 200. See Johnson, para. [0046]. In no case does Johnson teach or suggest shifting the digital baseband signal upward by the claimed amount.

Thus, Johnson does not anticipate amended independent claim 1, nor its dependent claims, which contain additional, patentable subject matter. This argument also applies to amended independent claims 9, 12, 18 and 26, which have similar features to those recited in independent claim 1. Reconsideration and withdrawal of the rejection of claims 1, 3, 5-10 and 12-27 under § 102(e) is therefore respectfully requested.

### §103 Rejection of the Claims

Claims 11, 28 and 29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson in view of Pikkarainen et al. (U.S. 5,701,106, hereinafter “Pikkarainen”). The Applicant does not admit that Pikkarainen is prior art, and reserves the right to swear behind this reference in the future. In addition, since a *prima facie* case of obviousness has not been established, the Applicant respectfully traverses these rejections.

The Examiner has the burden under 35 U.S.C. § 103 to establish a *prima facie* case of obviousness. *In re Fine*, 837 F.2d 1071, 1074, 5 U.S.P.Q.2d (BNA) 1596, 1598 (Fed. Cir. 1988). In combining prior art references to construct a *prima facie* case, the Examiner must show some

objective teaching in the prior art or some knowledge generally available to one of ordinary skill in the art that would lead an individual to combine the relevant teaching of the references. *Id.*

The M.P.E.P. contains explicit direction to the Examiner that agrees with the *In re Fine* court:

In order for the Examiner to establish a *prima facie* case of obviousness, three base criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. *M.P.E.P.* § 2142 (citing *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d (BNA) 1438 (Fed. Cir. 1991)).

Pikkarainen does not remedy the deficiency of Johnson. Thus, even combined, Johnson and Pikkarainen do not teach or suggest the feature recited in amended independent claims 9 and 26, wherein “the selected amount of frequency shift is greater than about a bandwidth of the digital baseband signal”. Thus, the Applicant submits that Johnson and Pikkarainen do not render amended independent claims 9 and 26 (as well as their dependent claims 11, 28 and 29) obvious. Reconsideration and withdrawal of the rejection of claims 11, 28 and 29 under § 103(a) is therefore respectfully requested.

### **RESERVATION OF RIGHTS**

In the interest of clarity and brevity, the Applicant may not have addressed every assertion made in the Office Action. The Applicant’s silence regarding any such assertion does not constitute any admission or acquiescence. The Applicant reserves all rights not exercised in connection with this response, such as the right to challenge or rebut any tacit or explicit characterization of any reference or of any of the present claims, the right to challenge or rebut any asserted factual or legal basis of any of the rejections, the right to swear behind any cited reference such as provided under 37 C.F.R. § 1.131 or otherwise, or the right to assert co-ownership of any cited reference. The Applicant does not admit that any of the cited references or any other references of record are relevant to the present claims, or that they constitute prior art. To the extent that any rejection or assertion is based upon the Examiner’s personal knowledge, rather than any objective evidence of record as manifested by a cited prior art reference, the Applicant timely objects to such reliance on Official Notice, and reserves all rights

to request that the Examiner provide a reference or affidavit in support of such assertion, as required by MPEP § 2144.03. The Applicant reserves all rights to pursue any cancelled claims in a subsequent patent application claiming the benefit of priority of the present patent application, and to request rejoinder of any withdrawn claim, as required by MPEP § 821.04.

### **CONCLUSION**

The Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone the Applicant's representative at (210) 308-5677 to facilitate prosecution of this Application. If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

SCHWEGMAN, LUNDBERG & WOESSNER, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(210) 308-5677

By / Mark V. Muller /  
Mark V. Muller  
Reg. No. 37,509